

IN THE INTERNATIONAL BUREAU OF WIPO

In re PCT application of CUMMINS INC., etal) Authorized Officer:
) Vinh T. Luong
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)
International Application Number PCT/US03/23542) Mailing Date
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) Reference:
Title of Invention CONNECTING ROD APPARATUS AND METHOD) 8016-616CUMM
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)

RESPONSE TO THE INTERNATIONAL SEARCH REPORT

The International Bureau
WIPO
34, chemin des Colombettes
1211 Geneva 20
Switzerland

Dear Sir/Madam:

In response to the International Search Report mailed 07 May 2004, regarding the above-referenced PCT patent Application, Applicant submits replacement pages 24-28, amending claims 1, 8 and 20. We have also added new claims 25 and 26. The remainder of the claims are unchanged.

Respectfully submitted

By


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Enclosures: Pages 24-28

WHAT IS CLAIMED IS:

1. An apparatus for an internal combustion engine with a crankshaft, a
5 cylinder and a reciprocating piston located within the cylinder, comprising:

a shank with two ends, a first pair of abutting surfaces, a first bearing
support surface and a pair of laterally facing surfaces, each one of said laterally
facing surfaces being substantially perpendicular from a different one of said first
pair of abutting surfaces, one end of said shank being attachable to the
10 reciprocating piston and the other end of said shank being mountable to a crankpin
of the crankshaft along said first bearing support surface; and

a cap with a second pair of abutting surfaces, a second bearing support
surface and a pair of projections, each one of said projections extending
substantially normally from a different one of said second pair of abutting surfaces,
15 said projections being adapted and configured to slidably receive therebetween in
an interference fit said laterally facing surfaces, said cap being mountable to the
crankpin along said second bearing support surface with said abutting surfaces
disposed on opposite sides of the crankpin;

wherein said projections of said cap compress said laterally facing surfaces
20 of said shank when said cap and said shank are mounted to the crankpin and each
one of said first abutting surfaces are in contact with a different one of said second
abutting surfaces.

2. The apparatus of claim 1, wherein said cap abutting surfaces and
said shank abutting surfaces are substantially flat.

25 3. The apparatus of claim 1, wherein said shank defines a split-line
and said shank further defines a centerline, wherein said split-line and said
centerline are separated by approximately 90 degree.

4. The apparatus of claim 1, wherein said shank defines a split-line
and said shank further defines a centerline, wherein said split-line and said
30 centerline are separated by less than 90 degree.

5 5. The apparatus of claim 1, wherein said shank defines a split-line
and said shank further defines a centerline, wherein said split-line and said
centerline are separated by approximately 60 degree.

6. The apparatus of claim 1, wherein said shank defines a split-line
and wherein said cap abutting surfaces and said shank abutting surfaces are
substantially parallel to said split-line.

10 7. The apparatus of claim 1, wherein said shank defines a split-line
and said projections resist movement between said cap and said shank parallel to
said split-line.

8. An apparatus for an internal combustion engine with a crankshaft, a
cylinder and a reciprocating piston located within the cylinder, comprising:

15 a shank with two ends, a first pair of abutting surfaces, a first bearing
support surface, and a pair of projections, each one of said projections extending
substantially normally from a different one of said first pair of abutting surfaces,
one end of said shank being attachable to the reciprocating piston and the other end
of said shank being mountable to a crankpin of the crankshaft along said first
20 bearing support surface;

 a cap with a second pair of abutting surfaces, a second bearing support
surface, and a pair of laterally facing surfaces, each one of said laterally facing
surfaces being substantially perpendicular from a different one of said second pair
of abutting surfaces, said cap being mountable to the crankpin along said second
25 bearing support surface;

 wherein said projections being adapted and configured to slidingly receive
therebetween in an interference fit said laterally facing surfaces, and wherein said
projections of said shank compress said laterally facing surfaces of said cap when
said shank and said cap are mounted to the crankpin and each one of said first
30 abutting surfaces are in contact with a different one of said second abutting
surfaces.

9. The apparatus of claim 8, wherein said cap abutting surfaces and said shank abutting surfaces are substantially flat.

5 10. The apparatus of claim 8, wherein said shank defines a split-line and said shank further defines a centerline, wherein said split-line and said centerline are separated by approximately 90 degree.

11. The apparatus of claim 8, wherein said shank defines a split-line and said shank further defines a centerline, wherein said split-line and said centerline are separated by less than 90 degree.

12. The apparatus of claim 8, wherein said shank defines a split-line and said shank further defines a centerline, wherein said split-line and said centerline are separated by approximately 60 degree.

13. The apparatus of claim 8, wherein said shank defines a split-line and wherein said cap abutting surfaces and said shank abutting surfaces are substantially parallel to said split-line.

14. The apparatus of claim 8, wherein said shank defines a split-line and said projections resist movement between said cap and said shank parallel to said split-line.

20 15. An apparatus for an internal combustion engine with a crankshaft and a cylinder with a reciprocating piston located therein, comprising:

a shank with an attachment portion, wherein said attachment portion has a width, and wherein said shank is attachable to the reciprocating piston and said shank is mountable to the crankshaft;

25 a cap with an attachment portion, wherein said cap attachment portion has a width and wherein said cap is mountable to the crankshaft and said cap attachment portion is attached to said shank attachment portion, wherein said shank and said cap form a sleeve around a segment of the crankshaft and the crankshaft is rotatably held therein;

a projection with a width wherein said projection width is substantially equal to one or more of said cap attachment portion width and said shank attachment portion width.

16. The apparatus of claim 15, wherein said projection width, said cap width and said shank width are substantially equal.

17. The apparatus of claim 15, wherein said shank includes an outer surface and said cap includes an outer surface, and wherein said projection is disposed on both said shank outer surface and said cap outer surface, wherein said projection is an integral portion of one of said shank outer surface or said cap outer surface, and wherein said projection is mounted to the other of said shank outer surface or said cap outer surface.

18. The apparatus of claim 17, wherein said projection is mounted to said other of said shank outer surface or said cap outer surface with an interference fit.

19. The apparatus of claim 18, wherein said projection width, said cap width and said shank width are substantially equal.

20. A method for attaching a connecting rod to a crankshaft of an internal combustion engine, comprising:

providing a two-piece connecting rod including a shank and a cap, one of the shank or the cap having a pair of spaced-apart, opposing substantially flat projections for receiving therebetween the other of the shank or the cap, the shank and cap forming a bearing pocket when brought together for rotatable connection to a crankpin of the crankshaft with projections on opposite sides of said bearing pocket;

placing one of the shank or the cap proximate to one side of the crankpin;

placing the other of the shank or the cap proximate to the other side of the crankpin;

bringing together the cap and the shank around the crankpin and forming the bearing pocket around the crankpin; and

5 compressing with the projections one of the shank or the cap around the crankpin by the other of the shank or the cap, said compressing being by said forming.

21. The method of claim 20, wherein said providing includes a plurality of fasteners, and said bringing together is by fastening together the shank and the
10 cap with the fasteners.

22. The method of claim 20, wherein the cap includes the projections, and the shank is compressed by the cap.

23. The method of claim 20, wherein the shank includes the projections, and the cap is compressed by the shank.

15 24. The method of claim 20, wherein the shank defines a split-line and the projections resist relative motion along the split-line between the shank portion and the cap portion.

25. The apparatus of claim 17, wherein said shank outer surface and said cap outer surface are substantially flat.

20 26. The method of claim 20, wherein said compressing produces an interference fit between said cap and said shank.